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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,044	06/24/2003	Gordon R. Woodcock	19441.0060	1043

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EXAMINER

DOVE, TRACY MAE

ART UNIT PAPER NUMBER

1745

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/604,044	Applicant(s) WOODCOCK ET AL.	
	Examiner Tracy Dove	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) 13-18 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12, 19 and 20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/12/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 4/12/06. Claims 1-20 are pending with claims 13-18 being withdrawn as being directed toward a nonelected invention.

Election/Restrictions

Claims 13-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention. Applicant timely traversed the restriction (election) requirement in the reply filed on 4/12/06. Applicant traverses on the grounds that Groups I and II are sufficiently linked or related. However, product claims are not limited by the method (different statutory classes). Furthermore, the product claims (Group I) directed toward a flow field plate are not limited by a reactant and do not contain a “serviced area”.

Claims Analysis

In claims 1-6, 19 and 20, only limitations regarding the claimed flow field plate are given patentable weight. The flow field plate does not comprise a “reactant”, an “area serviced” or a “current density”. In claim 19, “for use in a fuel cell” is not given patentable weight because it is an intended use limitation.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-12, 19 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains,

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or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites a “flow field path has a width, depth, and length such that a molar flow rate of reactant that enters said at least one flow field path is proportional to an area serviced by said at least one flow field path”, which is not enabled by the specification as filed. The specification does not enable one of skill to determine the width, depth and/or length of the flow field path. Claim 7 recites a “flow field path has a cross-sectional area and length such that a molar flow rate of reactant that enters said at least one flow field path is proportional to an area service by said at least one flow field path”, which is not enable by the specification as filed. The specification does not enable one of skill to determine the cross-sectional area and length of the flow field path. Claim 19 recites “each flow field path of said plurality of flow field paths has a width, depth, and length such that a flow rate of reactant in said flow field path is proportional to an area serviced by said flow field path”, which is not enabled by the specification as filed. The specification does not enable one of skill to determine the width, depth and/or length of the flow field path.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-12, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are indefinite because it is unclear how the width, depth and length of the first and/or second flow field paths are determined. Furthermore, the claims recite “proportional to said area serviced by said flow field path”, which is indefinite because it is unclear what “proportional to” encompasses. Specifically, the claims do not recite how the flow field path and area serviced correspond to each other.

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Claim 2 recites “a width, depth, and length”, “a flow rate of reactant” and “an area serviced”, which contain improper antecedent basis.

Claim 3 recites “a width, depth, and length”, which contains improper antecedent basis.

Claims 3, 6 and 20 are indefinite because a flow field plate does not have an electric current density. Claim 1 is directed toward a flow field plate, not an electrochemical fuel cell.

Claim 8 recites “a cross-sectional area and length”, “a flow rate of reactant” and “an area serviced”, which contain improper antecedent basis.

Claim 9 recites “a cross-sectional area and length”, which contain improper antecedent basis.

To the extent the claims are understood in view of the 35 USC 112, 1st & 2nd paragraph, rejections above, note the following prior art rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-12, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kothmann, US 4,292,379.

Kothmann teaches a fuel cell having variable area fuel cell process channels. Kothmann teaches a fuel cell arrangement having a non-uniform distribution of fuel and oxidant flow paths

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that are sized and positioned to provide approximately uniform fuel and oxidant utilization rates, and cell conditions, across the entire cell (abstract). Whereas prior arrangements utilized process channels which were of constant flow and surface area, the process channels disclosed by Kothmann vary in a manner such that more fuel is provided in the fuel channels nearest the fresh oxidant channel inlets and less fuel is provided in the fuel channels nearest the depleted oxidant channel outlets. Similarly, the oxidant channels provide more oxidant flow near the fresh fuel inlets, and less oxidant flow near the depleted fuel outlets. The flow and surface area are varied by providing, for example, larger rectangular shaped fuel channels which progressively decrease to smaller rectangular channels (2:10-30). In order to obtain a more uniform fuel utilization factor and improved current density and temperature distributions, the fuel channels and oxidant channels are unevenly sized or unevenly distributed, providing a variation among channels in flow volume and/or channel surface area (3:45-65). For example, in order to achieve 25% higher than average fuel flow near side AB (see Figure 2) and 25% lower than average fuel flow near side CD, fuel channels 26 are approximately 0.050 inches by 0.060 inches near side AB, and are approximately 0.040 inches by 0.060 inches near side CD (4:5-60).

Thus the claims are anticipated.

*

Claims 1-12, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Ferguson, US 2004/0151970.

Ferguson teaches an article bearing a flow field such as a distribution plate for use in a fuel cell. The active portion of the article comprises at least two subsections wherein channels within a first subsection have a cross-sectional profile that differs from that of channels within a

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second subsection. Typically, channels of the first subsection have lesser depth, greater draft or greater ratio of draft to depth. In addition, an article bearing a flow field is provided where the flow field comprises at least two channel segments which differ in draft (abstract, Figures 3A-3C and 3A'-3C'). See also [0034]-[0035]. Thus the claims are anticipated.

*

Claims 1-12, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Debe et al., US 6,780,536.

Debe teaches flow fields for uniform distribution of fluids or their active components or properties to and from a target area (2:32-36). The flow field may be embodied in a flow field device such as a flow field plate or bipolar plate used for distribution of reactants to, and removal of products from, opposite sides of a catalyzed membrane in an electrochemical cell such as a fuel cell (1:10-15). The flow fields provide more uniform access of the fluid or its active component to the target area by providing highly uniform lateral flux through the fluid transport layer separating the flow field from the target area for the transported fluid (4:54-61). Uniform distribution of the fuel cell reactants (fuel and oxidant) over the catalyst electrodes in a fuel cell should result in more uniform utilization of the catalyst, resulting in better performance, stability and durability. Furthermore, the flow fields result in more uniform distribution of current density and waste heat generation. It is believed that the partial pressures of fuel and oxidant at the surface of the catalyst at any given point in an electrode of a fuel cell are directly related to the speed of the lateral flux of the gas in the DCC (5:50-65). The flow field include significant land areas and may be composed of a single or multiple channels. The active area of the flow field may be any suitable size and shape and may be subdivided into separate zones serving

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separate portions of the target area. The flow field channels may have any suitable cross-section (6:32-57). See also 8:43-9:63. Thus the claims are anticipated.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 19, 2006


TRACY DOVE
PRIMARY EXAMINER